

Problem 6. Colours (15 marks)

Languages and their speakers have many ways of describing colours – sometimes by comparing to well-known materials (*copper hair*, *mustard wallpaper*); sometimes using very specific terms (*crimson ribbon*); and sometimes using very broad terms (*grey-blue sky*). English has 11 “basic colour terms”: *white*, *grey*, *black*, *red*, *orange*, *yellow*, *green*, *blue*, *purple*, *pink*, and *brown*. However, other languages can have as few as 2 or as many as 12.

Below is a table with 8 objects, and the basic colour term that native speakers of fifteen different languages might use to describe them. Note that colour vision is not necessary to solve this problem.

	<i>ripe plum</i>	<i>ripe strawberry</i>	<i>ripe banana</i>	<i>fresh grass</i>	<i>clear sky</i>	<i>deep ocean</i>	<i>adult crow</i>	<i>fresh snow</i>
Bassa	hui	ziza	ziza	hui	hui	hui	hui	ziza
Bété	kp	zeli	zeli	kp	kp	kp	kp	fee
Ejagham	ebi	ebi	ebi	enyaga	enyaga	enyaga	enyaga	ebare
Karajá	iso	iso	tyre	tyre	tyre	tyre	ilyby	ura
Matsés	piu	piu	piu	umu	umu	umu	chëshe	ushu
Apinaye	grãgrã	kamrêk	ràràr	grãgrã	grãgrã	grãgrã	tyk	aka
Tsafiki	luban	luban	laqueban	losimban	fiban	paban	paban	fiban
Seri	kʔe'el	kʔe'el	kwassool	ko'il	ko'il	ko'il	k'ooppool	ko'oxp
Guambiano	piguig	piguig	uscuig	chilga	pillig	pillig	yalig	polig
Teribe	dindin	sresren	shoylor	keson	dindin	dindin	sisi	pluplun
Tlapanec	minuu	mana	mojmo	maxa	maxa	minuu	skuni	mixa
English	purple	red	yellow	green	blue	blue	black	white
Yakan	taluk	peat	binaning	gaddung	bilu	bilu	ittem	pole
Amuzgo	tsjan'chi	wee	cajan	cachuii'	tsa	tsjo'	ntom	canchii'
Hebrew	sagol	adom	tsahov	yarok	t'khelet	kakhol	shakhor	lavan

In 1969, the anthropologist Brent Berlin and linguist Paul Kay proposed a set of rules about basic colour terms. Five of them are given below in a simplified form, with the objects *ripe plum* – *fresh snow* replaced with the letters (A) – (H).

1. Every language has at least two basic colour terms, which distinguish between (A) and (B).
2. If it has at least three, it uses different words for each of (A), (B) and (C). If it has only three, the same word is used for both (B) and (D).
3. If it has at least five, it distinguishes between (B) and (D), and also has a unique word for (E).
4. If it has at least six, it distinguishes (D) from (F).
5. A language only has a unique word for (G) if it has one for (H). Before then, (G) will share a word with at least one of (A), (D) or (F).

Although these rules are no longer believed to be completely true, they do still describe most languages accurately. In particular, they do describe all fifteen languages above.

[This problem continues on the next page.]

Q 6.1 Determine which object each of the letters (A) – (H) refers to.

Hint: your answers shouldn't feel especially counterintuitive – languages with fewer basic colour terms will distinguish colours that are more different, and not distinguish colours that are more similar.

Q 6.2 Below is a similar table for eight other languages. For each language, indicate whether or not the basic colour words given follow rules 1-5.

	<i>ripe plum</i>	<i>ripe strawberry</i>	<i>ripe banana</i>	<i>fresh grass</i>	<i>clear sky</i>	<i>deep ocean</i>	<i>adult crow</i>	<i>fresh snow</i>
Abidji	wāwanakoko	lebe	wāwanakoko	fwae	fwae	gale	lobu	lofu
Ese Ejja	huo'o	huo'o	jahua	tahua	pohui	tahua	tehui	oshi
Kwerba	nokonum	nokonum	kainanesenum	icem	asiram	icem	icem	asiram
Lele	wile	wile	bore	bore	bore	induwa	induwa	bole
Ocaina	tsipi	tsiho	boora	moxooso	moxooso	moxooso	jutohfu	furaana
Waorani	opa'tawae	opa'tawae	na'amae'ta	we'nedae	we'nedae	we'nedae	wintamo	na'amae'ta
Yucuna	ipirani	querani	jehuani	ipureni	ipureni	ipureni	cameni	jareni
Zapotec	nu-bizat	nu-na'	nu-cach	nu-ca'	nu-ca'	nu-asul	nu-cas	nu-cacy

Q 6.3 Below is another similar table, but with one word in each row replaced with a letter (a)-(c).

	<i>ripe plum</i>	<i>ripe strawberry</i>	<i>ripe banana</i>	<i>fresh grass</i>	<i>clear sky</i>	<i>deep ocean</i>	<i>adult crow</i>	<i>fresh snow</i>
Nafaanra	nye	nye	___(a)___	wə	wə	wə	wə	finge
Tucano	sōa'ro	sōa'ro	ewuro	___(b)___	ya'saro	ya'saro	ñiro	butiro
Kalam	likañ	___(c)___	walin	minj-kimemb	muk	muk	mosimb	tund

For each of (a)-(c), give all possible words from the same row that the language might use to refer to that object, while still following rules 1-5.

Language information

Abidji, Bassa, and Bété are Kru languages, spoken by around 85,000, 600,000 and 50 speakers respectively in West Africa. Amuzgo, Tlapanec, and Zapotec are clusters of Otomanguean languages spoken in Mexico by around 60,000, 150,000 and 500,000 people respectively. Apinaye and Karajá are Macro-Je languages spoken in central Brazil by around 2,000 – 3,000 people each. Ejagham and Nafaanra are Atlantic-Congo languages, spoken by around 120,000 people in Nigeria and Cameroon, and 90,000 people, mostly in Ghana. Ese Ejja is a Tacanan language spoken by around 700 speakers in Peru and Bolivia. Guambiano and Tsafiki are Barbacoan languages, spoken by around 20,000 and 2,000 in the Colombian and Ecuadorian Andes. Hebrew and Lele are Afro-Asiatic languages, with around 5 million native speakers, primarily in Israel, and around 26,000 speakers in Chad. Kalam is a Trans-New-Guinea language, spoken by around 15,000 people in Papua New Guinea. Kwerba is spoken by around 2,500 people in five villages in West Papua. Matsés is a Panoan language spoken by around 2,000 people on the Peru-Brazil border. Ocaina is a Huitotoan language, spoken by around 50 people along the Peru-Colombia border. Seri is a linguistic isolate spoken by 700 – 1000 people in Mexico. Teribe is a Chibchan language spoken by around 3,000 people in Panama and Costa Rica. Tucano is a Tucanoan language, spoken by around 12,000 people along the Vaupés river in Brazil and Colombia. Waorani is a linguistic isolate spoken by around 2,000 speakers in Ecuador. There are possibly more speakers living in uncontacted groups in Peru. Yakan is an Austronesian language, spoken by around 100,000 people in the Philippines. Yucuna is an Arawakan language, spoken by nearly 2,000 people along the Miritiparaná river in Colombia.

Problem 6. Colours Answers

6.1	A. <i>fresh snow</i>	E. <i>ripe banana</i>
	B. <i>adult crow</i>	F. <i>deep ocean</i>
	C. <i>ripe strawberry</i>	G. <i>clear sky</i>
	D. <i>fresh grass</i>	H. <i>ripe plum</i>

For Q6.2 tick the boxes corresponding to languages that follow the rules.

Abidji ☐	Ese Ejja ☐	Kwerba ☒	Lele ☒	Ocaina ☐	Waorani ☒	Yucuna ☐	Zapotec ☒
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6.3	a. <i>nye, wə, finge</i>	b. <i>ya'saro, butiro, sōa'ro</i>	c. <i>likañ, muk, minj-kimemb</i>
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Maximum 15 pts.

Q 6.1 Max 8. 1 pt each. Allow minor miscopying, e.g. *snow* for *fresh snow*, and misspellings, as long as it is clear what is intended.

Allow the English names of colours: *white, black, red, green, yellow, dark blue, light blue, purple*. Do not allow *blue*. Allow numbers 1-8 corresponding to the columns (i.e. 1 = *ripe plum*, 8 = *fresh snow*).⁷

Q 6.2 Max 4. Award 4 pts if completely correct. Award 3 pts if 7/8 boxes are correctly ticked or left blank. Award 2 pts if 6/8 boxes are correctly ticked or left blank. Award 1 pt if 5/8 boxes are correctly ticked or left blank. Award no points if 4 or fewer boxes are correct.

More succinctly: after four correct boxes, begin awarding 1 pt for a correct box.

Accept any indication of “correct” and “incorrect”, e.g. writing Yes/No, or crossing out languages that do not follow the rules, instead of leaving them blank.

Q 6.3 Max 3. 1 pt each if correct. No partial marks. Allow answers in any order.

Allow for minor misspellings, as long as it is clear what is intended.

Problem 6. Colours Commentary

Berlin & Kay’s original rules could be more accurately summarised as follows.

1. Every language distinguishes between “warm” red/yellow/white and “cool” green/blue/black.
2. Next, a language will split “warm” into white and red/yellow.*
3. Next, red/yellow splits into two words, referring to red and yellow, and green/blue/black splits into two words (either green and blue/black or green/blue and black.) These can happen in either order.

4. Next, the language evolves a unique word for blue, separate to both green and black.
5. Finally, the language evolves a word for brown, then purple, pink, grey, and orange in some order. Further distinctions, like light vs dark blue, come later.

These rules, in particular the last one, have come under a lot of scrutiny, although they seem to describe most languages.

*Note that Karajá and Lele treat most yellows as a shade of green/blue, but are otherwise regular.

References and further reading: The data is taken from The World Color Survey (P. Kay, 2010).